ONTARIO MINISTRY OF ENVIRONMENT
3693600024448

OPERATING SUMMARY

1974

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MINISTRY OF THE ENVIRONMENT

TD
367
.A56
R53
1974
MOE

TOWN OF

RICHMOND HILL

WATER POLLUTION CONTROL PLANT

TD
367
.A56
R53
1974

Richmond Hill : water pollution control plant.

81835

MINISTRY OF THE ENVIRONMENT

MINISTER
Honourable William G. Newman

DEPUTY MINISTER
E. Biggs

ASSISTANT DEPUTY MINISTER
REGIONAL OPERATIONS
J. Barr

REGIONAL OPERATIONS DIVISION

DIRECTOR, CENTRAL REGION
P. Cockburn

MANAGER, UTILITY OPERATIONS
A. Thomas

RICHMOND HILL

WATER POLLUTION CONTROL PLANT

operated for

THE TOWN OF RICHMOND HILL

by the

MINISTRY OF THE ENVIRONMENT

1974 ANNUAL OPERATING SUMMARY

prepared by

Plant Performance Unit

TECHNICAL SERVICES BRANCH

T. Cross, Director

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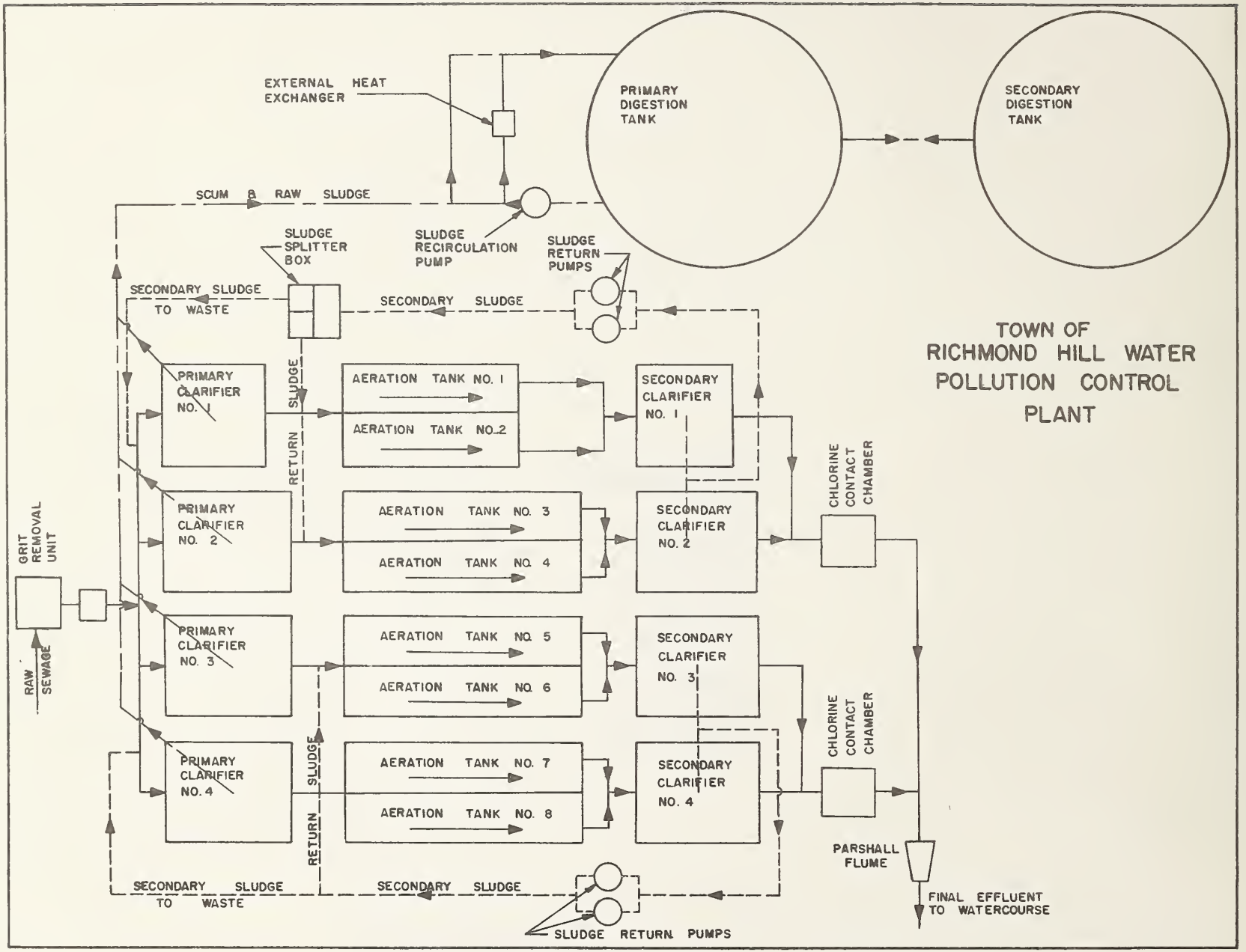

EXTERNAL HEAT EXCHANGER
PRIMARY DIGESTION TANK
SECONDARY DIGESTION TANK
SCUM & RAW SLUDGE
SLUDGE SPLITTER BOX
SLUDGE RECIRCULATION PUMP
SLUDGE RETURN PUMPS
SECONDARY SLUDGE TO WASTE
SECONDARY SLUDGE
TOWN OF RICHMOND HILL WATER POLLUTION CONTROL PLANT
PRIMARY CLARIFIER NO. 1
SLUDGE
RETURN
AERATION TANK NO. 1
AERATION TANK NO. 2
SECONDARY CLARIFIER NO. 1
PRIMARY CLARIFIER NO. 2
AERATION TANK NO. 3
AERATION TANK NO. 4
SECONDARY CLARIFIER NO. 2
CHLORINE CONTACT CHAMBER
GRIT REMOVAL UNIT
RAW SEWAGE
PRIMARY CLARIFIER NO. 3
AERATION TANK NO. 5
AERATION TANK NO. 6
SECONDARY CLARIFIER NO. 3
PRIMARY CLARIFIER NO. 4
AERATION TANK NO. 7
AERATION TANK NO. 8
SECONDARY CLARIFIER NO. 4
PARSHALL FLUME
FINAL EFFLUENT TO WATERCOURSE
SECONDARY SLUDGE TO WASTE
SECONDARY SLUDGE
SLUDGE RETURN PUMPS

DESIGN DATA

PROJECT	Town of Richmond Hill WPCP
PROJECT NO.	2-0006-57
TREATMENT	Activated Sludge
DESIGN FLOW	1.60 mgd
DESIGN POPULATION	16,000
BOD - Raw Sewage	200 mg/l
- Removal	90%
SS - Raw Sewage	220 mg/l
- Removal	95%

PRIMARY TREATMENT

Grit Removal

Type: Aerated
Size: One 15½' x 6' x 9' swd (5,220 gal)
Retention: 4.7 min

Primary Sedimentation

Type: Dorr
Size: One 16' dia x 10' swd
One 26' dia x 10' swd
Two 26' dia x 9.7' swd
(110,000 gal)
Retention: 1.65 hr
Loading: Surface, 908 gal/ft^2/day
Weir, 4880 gal/ft/day

SECONDARY TREATMENT

Aeration Tanks

Type: Diffused air; single-pass
Size: Two 58' x 9' x 9'
Two 81' x 14½' x 10¼'
Four 81' x 14½' x 9 1/3'
(482,700 gal)
Retention: 7.2 hr

Diffusers

- Carborundum diffusers

Air Supply

a) Type: Standaire (C.P.)
Size: One 400 scfm
Two 510 scfm

b) Type: Sutorbilt
Size: One 1,000 scfm

Secondary Sedimentation

Type: Dorr
Size: One 19' dia x 10' swd
One 30' dia x 10' swd
Two 30' dia x 9.7' swd
(147,180 gal)
Retention: 2.21 hr
Loading: Surface, 667 gal/ft^2/day
Weir, 4120 gal/ft/day

CHLORINATION

Type: W & T
Size: One 200 lb/day

Chlorine Contact Chamber

Size: Two 25' x 10' x 8' (25,000 gal)
Retention: 22½ min

OUTFALL

- to German Mills Creek

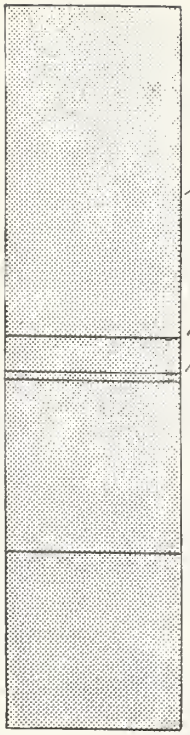
SLUDGE HANDLING

Digestion System - two-stage

Primary --
Type: Walker, 1 draft tube
Size: One 50' dia x 20' swd (39,200 ft^3 or 0.245 mil gal)

Secondary--
Type: Dorr (has one draft tube)
Size: One 30' dia x 19' swd (13,400 ft^3 or 83,500 gal)

ANNUAL COSTS



1974 OPERATING COSTS

SALARIES & WAGES	47 %
EMPLOYEE BENEFITS	5 %
TRANSPORTATION & COMMUNICATIONS	1 %
SERVICES	22 %
SUPPLIES & EQUIPMENT	25 %
AQUISITION/CONSTRUCTION OF PHYSICAL ASSETS	
TRANSFER PAYMENTS	
OTHER TRANSACTIONS	

YEARLY OPERATING COSTS

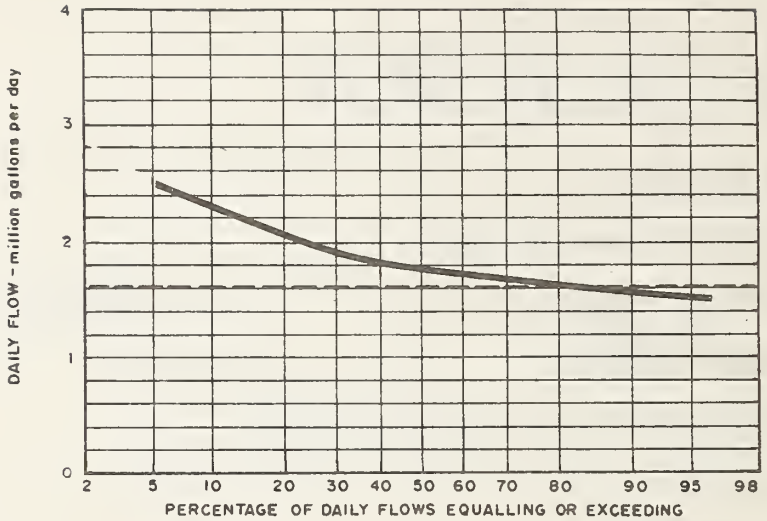
YEAR	SEWAGE TREATED in million gallons	TOTAL OPERATING COSTS	UNIT COSTS $/M G	UNIT COSTS ¢/lb BOD
1969	770	60, 795	79	7
1970	822	78, 533	95	8
1971	865	76, 760	89	4
1972	663	95, 203	144	10
1973	688	97, 585	142	8
1974	689	102, 598	149	10

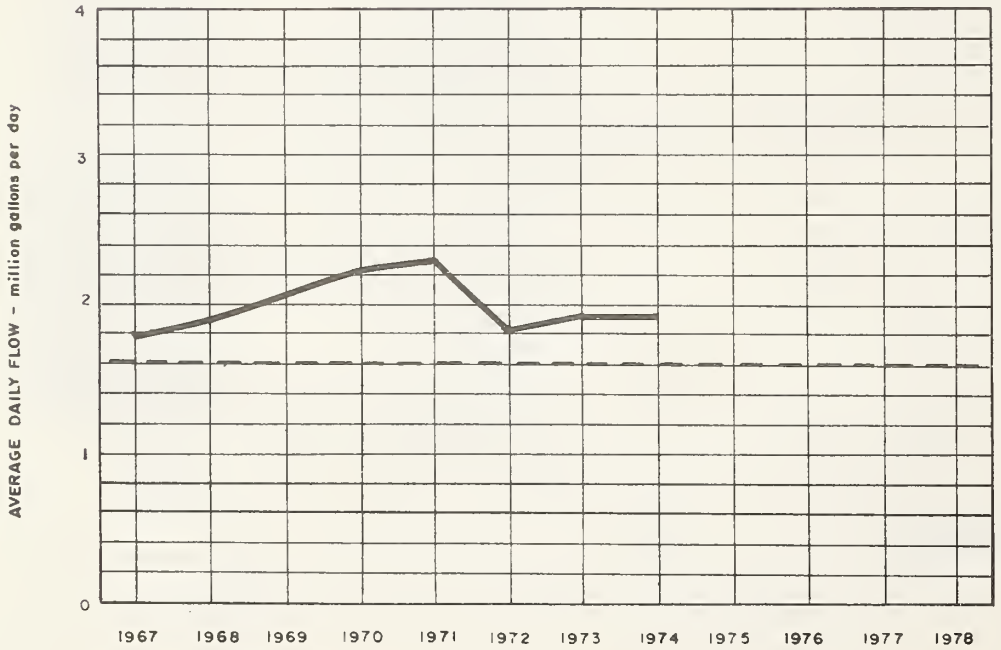
OPERATING EXPENDITURES

Regular Staff	$ 44,370	$
Casual (Unclassified) Staff	3,528	
TOTAL SALARIES AND WAGES		47,898
TOTAL EMPLOYEE BENEFITS		4,903
TOTAL TRANSPORTATION AND COMMUNICATIONS		892
Insurance	1,630	
Sludge Haulage	18,382	
Repairs and Maintenance	2,566	
Other Services	385	
TOTAL SERVICES		22,963
Machinery and Equipment	2,488	
Chemicals	6,751	
Utilities	13,936	
Other Supplies and Equipment	2,767	
TOTAL SUPPLIES AND EQUIPMENT		25,942
TOTAL AQUISITION/CONSTRUCTION OF PHYSICAL ASSETS		
TOTAL TRANSFER PAYMENTS		
OTHER TRANSACTIONS		
GRAND TOTAL	GRAND TOTAL	$ 102,598

PROCESS DATA

FLOWS



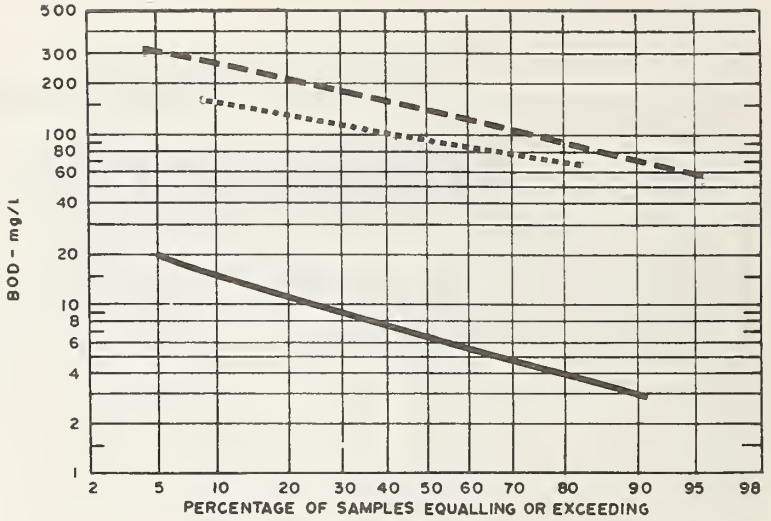


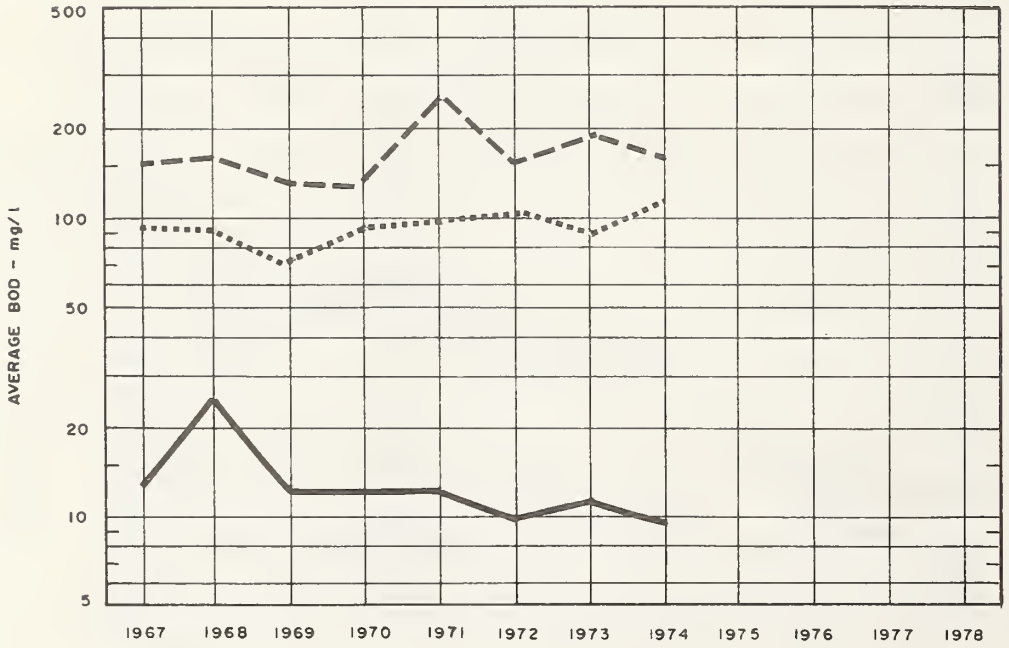
DESIGN CAPACITY _ _ _ _ _ _ _ _

PLANT PERFORMANCE

MONTH	FLOWS			BIOCHEMICAL OXYGEN DEMAND				SUSPENDED SOLIDS				PHOSPHORUS	
	TOTAL FLOW	AVERAGE DAY	MAXIMUM DAY	INFLUENT	EFFLUENT	REDUCTION		INFLUENT	EFFLUENT	REDUCTION		INFLUENT	EFFLUENT
	million gallons	mil. gal	mgd	mg/l	mg/l	%	10^3 pounds	mg/l	mg/l	%	10^3 pounds	mg/l P	mg/l P
JAN	59	1.9	3.0	163	19	88	85	263	30	89	138	7.4	3.2
FEB	49	1.8	2.6	280	18	94	128	510	10	98	245	11.0	4.1
MAR	58	1.9	2.9	78	11	86	39	95	13	86	48	5.2	2.6
APR	63	2.1	2.8	120	10	92	69	130	20	85	69	5.8	3.0
MAY	56	1.8	3.0	193	4	98	106	348	15	96	188	8.8	3.0
JUNE	60	2.0	2.7	90	8	91	49	290	15	95	164	6.7	4.7
JULY	54	1.8	2.3	189	5	97	101	235	15	94	120	7.6	3.4
AUG	52	1.7	2.0	80	6	93	38	130	15	88	60	6.4	3.8
SEPT	53	1.8	2.0	140	10	93	70	348	15	96	178	8.7	4.1
OCT	69	2.2	2.5	177	5	97	119	220	15	93	141	8.3	2.8
NOV	57	1.9	2.8	140	6	96	76	290	20	93	154	7.1	3.6
DEC	59	1.9	2.0	190	7	96	108	700	15	98	403	15.0	2.6
TOTAL	689	-	-	-	-	-	1020	-	-	-	1819	-	-
AVG.	57	1.9	MAXIMUM 3.0	157	9	94	85	281	17	94	151	8.0	3.3
No. of Samples	-	-	-	22	23	-	-	22	23	-	-	22	23

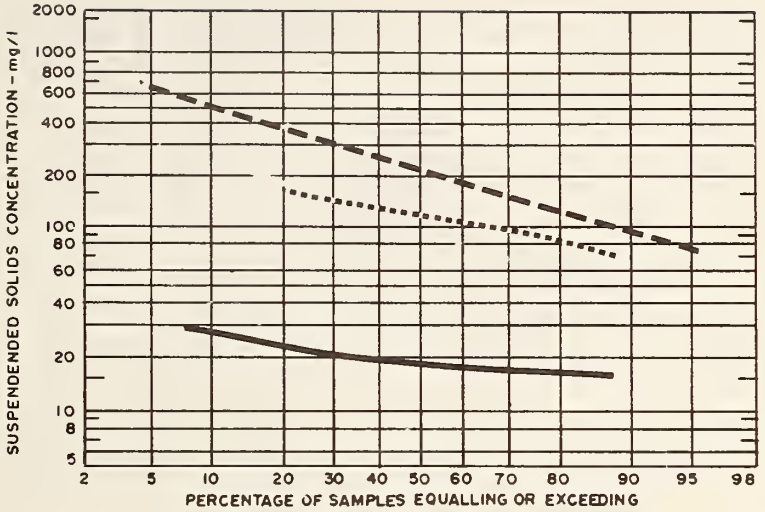
BIOCHEMICAL OXYGEN DEMAND

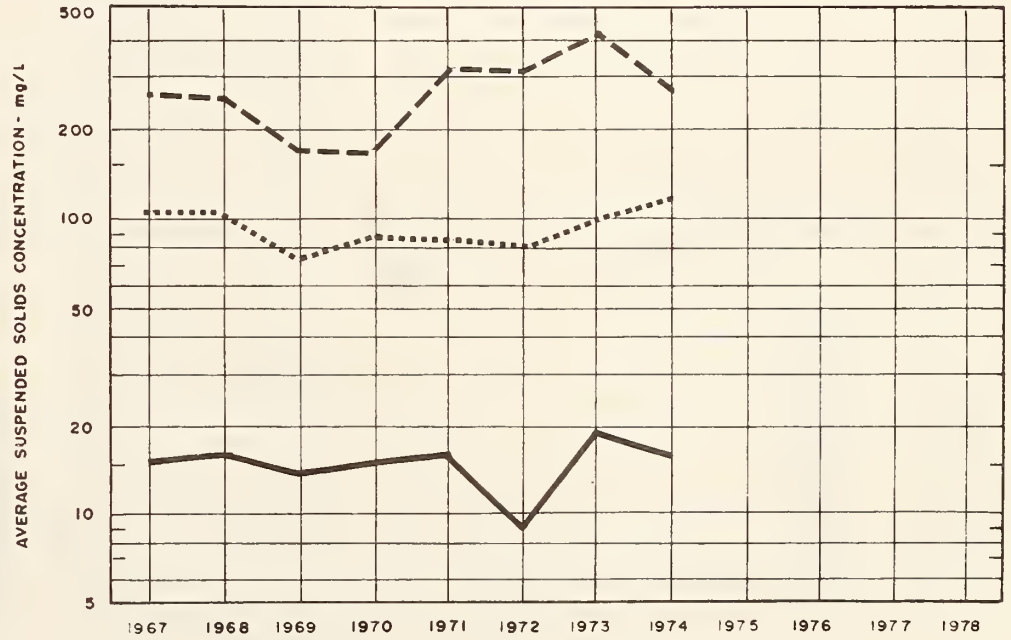




PLANT INFLUENT
PRIMARY EFFLUENT
PLANT EFFLUENT

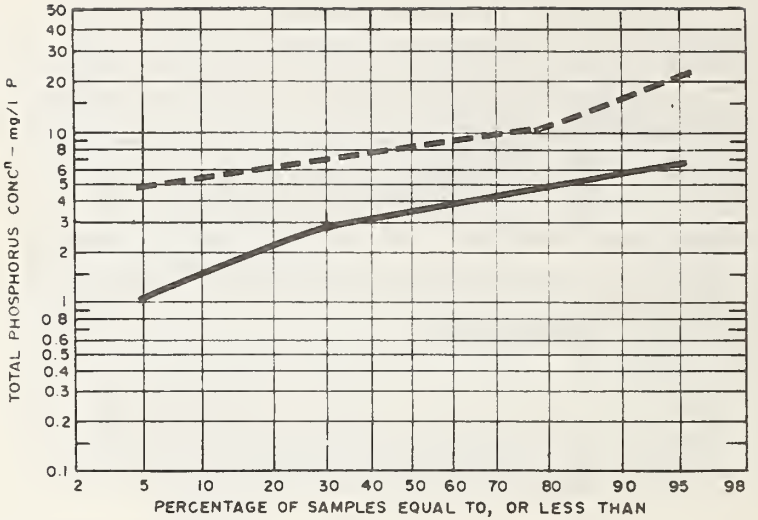
SUSPENDED SOLIDS

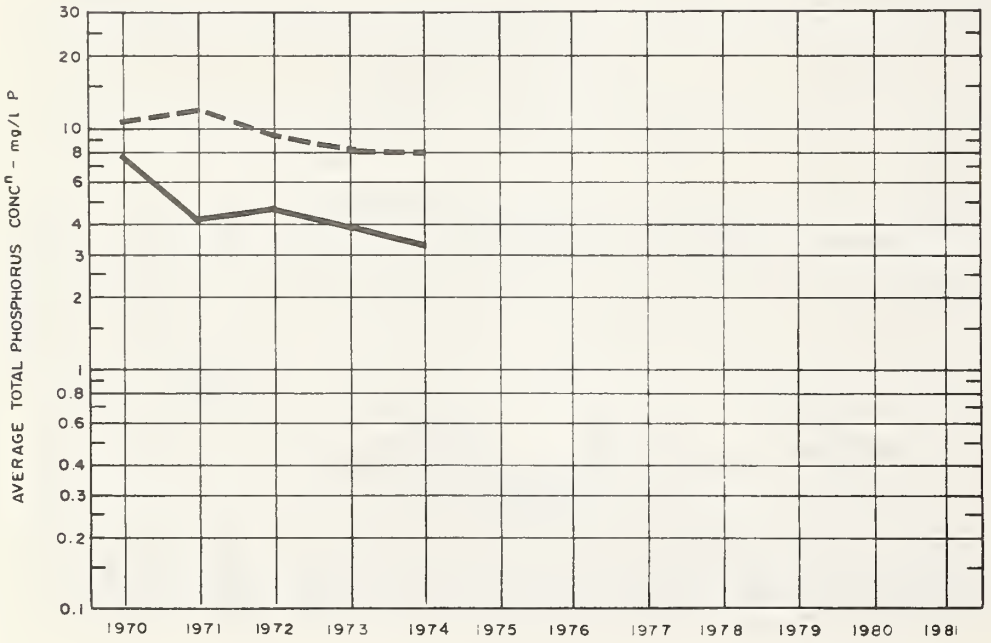




PLANT INFLUENT
PRIMARY EFFLUENT
PLANT EFFLUENT

PHOSPHORUS

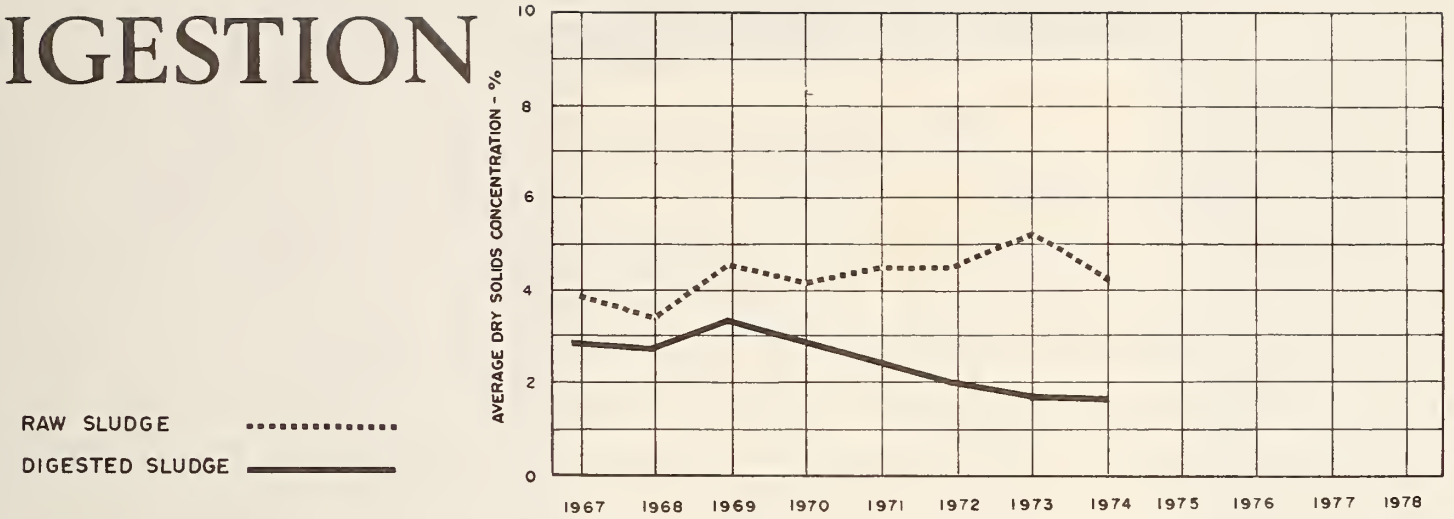


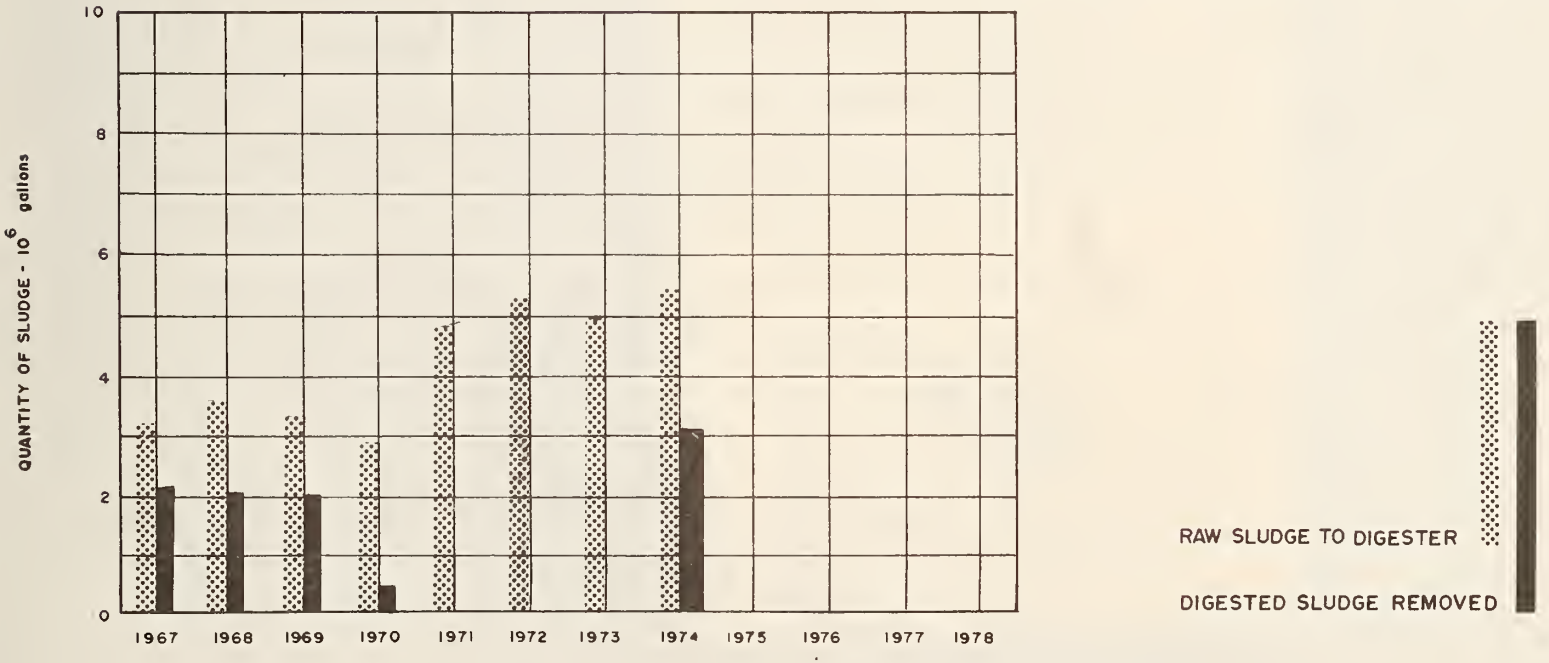


PLANT INFLUENT

PLANT EFFLUENT

DIGESTION


AVERAGE DRY SOLIDS CONCENTRATION - %
0
2
4
6
8
10
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978
RAW SLUDGE
DIGESTED SLUDGE


QUANTITY OF SLUDGE - 10^6 gallons
0
2
4
6
8
10
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978
RAW SLUDGE TO DIGESTER
DIGESTED SLUDGE REMOVED

TREATMENT DATA

MONTH	GRIT	CHLORINATION		PRIMARY EFFLUENT		AERATION			SLUDGE DIGESTION and DISPOSAL							
									RAW SLUDGE			DIGESTED SLUDGE			SUPER-NATANT	
	QUANTITY REMOVED cubic feet	Cl_2 USED 10^3 pounds	AVG. DOSE mg/l	BOD mg/l	SUSPENDED SOLIDS mg/l	MLSS CONC mg/l	F/M day^{-1}	AIR $\frac{1000\ ft^3}{lb\ BOD}$	QUANTITY 10^5 gallons	TOTAL SOLIDS %	VOL. SOLIDS %	QUANTITY 10^5 gallons	TOTAL SOLIDS %	VOL. SOLIDS %	T. S. %	AMOUNT HAULED cubic yards
JAN	85	3.9	6.5	83	80	2500	.13	3.8	4.1	10.9	87	2.6	1.3	65	1.3	1566
FEB	70	3.2	6.6	550	190	2700	.76	.4	3.8	4.2	78	2.4	1.6	63	1.4	1404
MAR	120	3.3	5.7	88	110	1900	.18	2.7	4.6	1.2	72	2.3	1.4	64	1.6	1350
APR	63	3.4	5.4	85	108	2300	.16	2.8	4.2	3.8	77	2.8	1.9	66	2.0	1638
MAY	94	3.6	6.3	93	110	3500	.10	2.6	3.4	3.2	74	2.5	2.0	67	1.6	1512
JUNE	105	3.4	5.7	80	120	2300	.14	2.6	4.1	3.8	79	2.1	1.8	68	1.5	1262
JULY	101	3.1	5.7	78	80	1800	.16	3.1	5.1	4.0	80	2.2	2.3	70	1.8	1314
AUG	108	3.1	6.0	120	180	2600	.16	2.0	5.3	3.7	73	2.5	1.9	66	1.9	1492
SEPT	106	2.8	5.3	85	130	2800	.11	2.9	5.4	4.2	75	2.1	2.0	67	2.0	1272
OCT	108	3.0	4.5	110	98	2400	.21	1.7	5.2	5.7	79	3.1	1.8	64	1.5	1872
NOV	107	3.2	5.7	140	135	1900	.29	1.6	5.2	4.7	70	3.0	1.3	64	1.3	1800
DEC	101	3.4	5.7	70	110	3200	.09	3.3	5.4	2.5	76	3.2	2.6	81		1926
TOTAL	1168	39.4	–	–	–	–	–	–	55.8	–	–	30.8	–	–	–	18408
AVG.	1.6 cu. ft/mil gal	3.3	5.7	132	121	2500	.21	2.5	4.7	4.3	77	2.6	1.8	67	1.6	1534

Date Due

LAB

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